THE JOURNAL OF SCHOOL HEALTH

Vol. XXIV. No. 1

JANUARY

1954

Gertrude E. Cromwell, R. N.
414 14th St.
Denver 2, Colo.

PUBLISHED BY

THE AMERICAN SCHOOL HEALTH ASSOCIATION

AMERICAN SCHOOL HEALTH ASSOCIATION

Organized 1927

Devoted to the interests and advancement of those engaged in school health activities and the service rendered by them

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THE JOURNAL OF SCHOOL HEALTH
THE AMERICAN SCHOOL HEALTH ASSOCIATION
Urbana, Ill.

Published monthly, except July and August, at Buffalo, N. Y.

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Membership dues, $3.00 including Journal: Subscription $3.00
SUBSCRIPTION RATES TO THE JOURNAL
Single copies 35c, send payment with order

Address all communications to
THE EDITOR, The Journal of School Health
University of Illinois, Urbana, Ill.

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Entered as second-class matter at the Post Office at Buffalo, N. Y.
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Vol. XXIV JANUARY, 1954 No. 1

POLIO VACCINE VALIDITY STUDY

C. E. TURNER, Ed.M., Dr. P.H.

Assistant to the President

National Foundation for Infantile Paralysis

School health personnel will be interested in the plans for the field trials of the polio vaccine. At your editor's request the writer is glad to report to you the plans developed by the Medical Department of the National Foundation.

The field trials will be carried out as a National Foundation activity under the direction of Hart E. Van Riper, M.D., Medical Director. The study is being conducted with the close cooperation of state and county public health officers, various medical societies, and school authorities.

The vaccine to be studied is the one recently developed by a research grantee of the National Foundation — Dr. Jonas E. Salk, research Professor of Bacteriology at the University of Pittsburgh. It will be given to between 500,000 and 1,000,000 second grade children in carefully selected counties throughout the country. The basic controls will be the children in the 1st and 3rd grades. During the 1954 epidemic season the incidence of paralytic polio in these three grades will be studied. The results will not be known until some time in 1955.

State health officers are cooperating in the selection of counties on the basis of polio incidence, public health and educational facilities, and other factors. The vaccinations will start in the southern states during the week of February 8th and will be carried on through the non-epidemic period or until about June 1st. All children in grade 2 of the participating public, parochial, and private schools in the area selected will be vaccinated.

It is planned to give three injections of the vaccine, each dose being 1 c.c. The first two doses will be given at one week intervals. The third dose, which acts as a "booster," will be given four weeks later. All injections will be in the arm.

The vaccine to be used is composed of killed virus of all three types, which have been grown in test tube cultures of monkey kidney tissue. The virus is killed by exposure to formalin and prepared in an aqueous solution. Dr. Salk has administered a vac-

cine of this type with successful results to about 700 persons. As the study progresses the vaccine may be produced by a number of pharmaceutical houses. All vaccine, however, will be produced according to Dr. Salk's formula. It will pass through three independent series of safety tests.

In each county selected as a test area, carefully laid plans will be developed with the cooperation of state and local health and education authorities. In each county the local health officer will be in charge. Local physicians will administer the injections. Volunteers from the National Foundation's Chapters will help in organizing and manning the studies. Civic and community groups will also participate in the project.

* * * * *

THE PRESIDENT-ELECT

The new President-Elect is Kenneth Richard Gibson, Sr., Director Child Health Division and Assistant Secretary of The Children's Fund of Michigan (660 Frederick Street, Detroit 2, Michigan). Dr. Gibson has had a distinguished career in dentistry dating back to 1918. He has been in private practice and also has been Director of the Dental Division in the Michigan Department of Public Health. He holds fellowships in the American College of Dentists, American Public Health Association, and the American School Health Association. He is also at present a member of the Governing Council of the latter organization. He holds membership in a number of dental and public health associations in the State of Michigan. He has also been Director of the Association of Public Health Dentists and Dental Hygienists of that state. He was the first president of the National Society for the Promotion of Children's Dentistry (1930).

He holds a D.D.S., 1918; an MSPH, 1938; and has done considerable work toward his D.P.H. at the University of Michigan. He is a member of the National Honorary Dental Fraternity, Omicron Kappa Upsilon, and of Psi Omega, Dental Fraternity, and is the author of numerous articles in the field of dental health education and public health dentistry.

RECRUITMENT AND PLACEMENT OF HEALTH EDUCATION MAJORS

Committee on Teacher Preparation in Health Education
American School Health Association

The past two decades, in the United States, have witnessed a marked increase of interest in the preparation of health teachers. This growth in interest has been gradual and is due to many factors. However, the Second World War may have given the same kind of a push to health education that World War I gave to physical education. Regardless of the reasons, there is substantial evidence of widespread interest in the preparation of health educators.

Several important national conferences have been held and excellent reports have been made available concerning the preparation of health educators at the undergraduate and graduate levels.[1] State, regional and national conferences—sponsored by organizations such as the American Association for Health, Physical Education and Recreation, the American Public Health Association, and the American School Health Association—have included this important topic on the programs. Also many significant articles and committee reports have been published about the preparation of health educators.[2]

Despite this excellent work, it has been difficult to find reliable information about the recruitment, enrollment, graduation and placement of health educators. So, the Committee on Teacher Preparation in Health Education—formed in 1951 by the Ameri-

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1 Jackson's Mill Conference. *Undergraduate Professional Preparation in Physical Education, Health Education and Recreation.* Chicago, Illinois: The Athletic Institute. 40 pp. 1948.

Washington Conference (First). *Undergraduate Professional Preparation of Students Majoring in Health Education.* Washington, D. C.: U. S. Office of Education. 84 pp. 1949.

Pere Marquette Conference. *Graduate Study in Health Education, Physical Education and Recreation.* Chicago, Illinois: The Athletic Institute. 31 pp. 1950.

Washington Conference (Second). *Undergraduate and Graduate Preparation of Students Majoring in Health Education.* Washington, D. C.: U. S. Office of Education (to be published in 1953).

2. Committee on Professional Preparation A.P.H.A., *Educational Qualifications of Community Health Educators.* New York, N. Y.: American Public Health Association. 8 pp. 1948.

Hicks, D. "Preparing Teachers for the Secondary Health Education Program." Journal of the American Association for Health, Physical Education and Recreation. Vol. 22. No. 8. pp. 7-8, 10, 42. October, 1951.

Haag, J. H. "The Need for Secondary School Health Educators." The Journal of School Health. Vol. 22. No 10. pp. 283-286. December, 1952.

can School Health Association—decided to tackle this problem as its first major task.

The Committee prepared a questionnaire, which was revised after a trial run. It was designed primarily to secure information from those institutions offering an undergraduate and/or graduate health education major, but *not* having a School of Public Health. Information concerning graduate students enrolled in and graduating from accredited schools of public health has been published, from time to time, in the American Journal of Public Health.

However, questionnaires were sent to the University of California (Berkeley) and the University of North Carolina since, in addition to graduate work in public health, these two institutions offer a four year undergraduate program in health education.

UNDERGRADUATE HEALTH EDUCATION MAJORS

Some thirty-five colleges and universities, in the United States, now offer an undergraduate health education major. Replies were received from thirty-two of these institutions as follows: Boston University, Brooklyn College, University of California (Berkeley), University of California (Los Angeles), University of Cincinnati, Columbia University, State University Teachers College (Cortland, New York), University of Denver, University of Florida (Gainesville), University of Florida (Tallahassee), Fresno State College, University of Illinois, Indiana University, University of Maryland, Mississippi Southern College, University of North Carolina, Ohio State University, University of Omaha, University of Oregon, Oregon State College, College of Pacific, Pennsylvania State College, San Jose State College, Southern Illinois University, Springfield College, Stanford University, Syracuse University, University of Utah, Utah State University, University of Washington, West Virginia State College, Wisconsin State College.

Recruitment Problems. Some of the recruitment problems listed by one or more of the respondents from these institutions were:

1) It is unfair to the students to overrecruit in relation to the health education jobs available.

2) Many prospective candidates have become soured on health education as a possible professional career: because, as students in high school and/or college, they experienced poor health teaching by untrained, uninterested and uninteresting teachers.

3) Health education has not been properly depicted as a professional career by vocational guidance counselors. Inadvertently, it is often described as physical education.

4) Salaries are too low in health education to attract superior students who can do better financially in other professions.

5) Health education is such a new field that it has little prestige and lacks the dramatic appeal necessary to attract young men and women.

6) Those students who wish to continue on to graduate work in a school of public health, and then follow a career in public health education, are often blocked by the three-year experience requirement needed for entraance into the graduate program leading to a Master of Public Health degree.

Recruitment Methods. According to the respondents the most successful recruitment methods have been (not listed in rank order): 1) recruiting majors from other fields such as physical education, science and liberal arts; 2) recruitment of high school students by alumni who are teaching health or in closely related fields; 3) health education majors "selling" other students; 4) personal conferences with prospective health majors; 5) distributing health education fliers and career pamphlets; and 6) talks at career days and conferences in high schools and colleges.

Enrollment of Undergraduate Majors. Table I shows there are three hundred and two (302) undergraduate health education majors enrolled in the thirty-two institutions during the 1952-1953 school year. It should be noted that students enrolled in combined health and physical education curricula were *not* included in this study.

TABLE I

Undergraduate Health Education Majors Enrolled During the 1952-1953 School Year, United States*

	Freshmen	*Sophomores*	*Juniors*	*Seniors*	*Totals*
Men	24	25	42	49	140 men
Women	25	23	54	60	162 women
Totals	49	48	96	109	302

* Includes 32 institutions responding to the questionnaire.

Majors Granted Bachelor's Degree. Table II shows that five hundred and seven (507) undergraduate health majors were granted a bachelor's degree during the five year period, 1947-1952. Approximately one hundred students per year received the bachelor's degree.

TABLE II

Undergraduate Health Education Majors Granted the Bachelor's Degree, Five School-Year Period 1947-1952, United States*

	1947-1948	1948-1949	1949-1950	1950-1951	1951-1952	Totals
Men	35	43	49	53	55	235 men
Women	53	55	51	59	54	272 women
Totals	88	98	100	112	109	507

* Includes 32 institutions responding to questionnaire.

Placement of Undergraduate Majors. The placement of the five hundred and seven (507) health educators, holding a bachelor's degree, granted during the 1947-1952 school-year period, is shown in Table III.

A total of 132, or approximately 26 per cent, of these health educators secured some type of school health education job in a public or parochial school or in a college or university. These positions were distributed as follows: senior high school 75; elementary schools 25; colleges or universities 21; and junior high schools 11.

It is interesting to note that one hundred and fourteen (114), or approximately twenty-two (22) per cent, were placed in some type of position involving public health education. These positions were distributed as follows: voluntary health agencies 67; public health departments 37; industrial and commercial health educator 7; and public health apprenticeship 3.

Table III indicates that it has been difficult, but not impossible, to place health educators holding the bachelor's degree. Only six (6) of these five hundred and seven (507) graduates were listed as unemployed.

TABLE III

Placement of Health Education Majors, with a Bachelor's Degree, Five School-Year Period, 1947-1952, United States.

Rank Order	*Type of Placement*	*Number*
1	Senior High School	75
2	Voluntary Health Agency	67
3	Graduate Work	61
4	Unaccounted for	55
5	Public Health Department	37
6	Housewife	33
7	Physical Education and Recreation	30
8	Military Service	25
9	Elementary School	25
10	College or University	21
11	Junior High School	11
12	Health Coordinator	10
13	Nursing Supervisor	10
14	School Nurse and Health Education	10

15	Physical Therapy	9
16	Unemployed	6
17	Industrial Health Educator	4
18	Commercial Health Educator	3
19	Public Health Apprentice	3
20	Miscellaneous Placement*	12
	Total	507

*These 12 *positions were distributed as follows*: Department of Public Welfare 1; Civilian Director of Health, Air Base 1; Research Chemist 1; Dental Hygienist 2; Club Work 1; Business 1; Credit Agency 1; State Health Council 1; Hospital Attendant 2; and Juggler on the Stage 1.

GRADUATE HEALTH EDUCATION MAJORS

Nineteen of the thirty-two institutions responding to the questionnaire offer a graduate major in health education leading to a graduate degree.

Recruitment Problems. Some of the recruitment problems listed by one or more of the respondents from these nineteen institutions were:

1) Some students without proper undergraduate training want to enroll in health education programs leading to graduate degrees — but they do *not* wish to make up essential undergraduate perequisites.

2) Stipends for graduate assistantships and scholarships are too low in relation to the current cost of living, especially for married students.

3) Good health education positions are too few and salaries are too low to attract top quality students, some of whom can and do go into more lucrative fields.

4) There is a current lack of prestige and dramatic appeal in health education as a lifetime professional career as compared to medicine, law, engineering and other fields.

5) There is a lack of well-defined master's and doctoral programs in health education, leading to research-type degrees (M.S. and Ph.D. with theses) for those with scholarly aptitude and interest, who would like to prepare themselves for health education jobs in colleges and universities.

6) There is a current dilemma over school health education versus public health education — especially reflected in the job preference, in certain types of positions, for those health educators who hold a Master of Public Health degree, with a major in Public Health Education, from an accredited school of public health.

Recruitment Method. According to the respondents, the most successful methods of recruiting good graduate students were (not listed in rank order); 1) provison of stipends for scholarships,

fellowships and teaching and research asssistantships; 2) personal conferences with undergraduate seniors in health education and allied fields; 3) posting notices of job opportunities in health education; 4) sending out printed materials to other institutions such as fliers, career pamphlets and announcements of scholarships; 5) personal contacts through extension courses, workshops, conferences, etc.; 6) graduate health majors "selling" other students; and 7) making graduate health courses in colleges and universities so worthwhile that good students want to enroll.

Enrollment of Graduate Majors. Table IV shows that two hundred and sixty-eight (268) graduate health education majors were enrolled, during the 1952-1953 school year, in the nineteen institutions offering graduate programs in health education, leading to a teaching certificate and/or graduate degrees. Two hundred and fifty-two, or approximately ninety-three per cent are working towards either the master's or doctoral degree, with a major in health education.

TABLE IV

Graduate Health Education Majors Enrolled 1951-1952 School Year, United States*

Sex	*Bachelor's Degree and Teaching Credential*[1]	*Master's Degree*	*Director's Degree*[2]	*Doctoral Degree*	*Totals*
Men	10	84	2	51	147 men
Women	4	88	0	29	121 women
Totals	14	172	2	80	268

*Does *not* include graduate students enrolled in Schools of Public Health.

Majors Granted Graduate Degrees. Table V shows the number of graduate health education majors granted a teacher's credential (involving work beyond the bachelor's degree) or graduate degree(s) during the five school-year period from 1947 to 1952. Four hundred and fifteen (415), or approximately ninety-two per cent, were granted either the master's or doctoral degree. The yearly totals show an increased number of students receiving graduate degrees, with a major in health education, for each successive year. An average of ninety (90) students per year were awarded some type of certificate or graduate degree involving work beyond the bachelor's degree.

1. Such as is required in California and other states—where students *may* complete the Bachelor's Degree, with a major in health education, and complete requirements for a general secondary credential during the fifth year, but do not necessarily complete a Master's Degree.
2. Such as is granted by Indiana University.

TABLE V

Graduate Degrees and Certificates to Health Education Majors Five School-Year Period 1947-1952, United States*

Degree	1947-1948 *M*	*W*	1948-1949 *M*	*W*	1949-1950 *M*	*W*	1950-1951 *M*	*W*	1951-1952 *M*	*W*	*Tot'ls*
Bachelor's Degree and Teaching Certificate[1]	0	0	1	1	6	0	8	1	6	3	26
Master's Degree	31	25	32	28	45	28	54	33	46	40	362
Director's Degree	2	0	0	0	1	0	1	0	5	0	9
Doctoral Degree	4	3	6	3	8	4	7	3	10	5	53
Totals by Sex	37	28	39	32	60	32	70	37	67	48	450
Totals by Year	65		71		92		107		115		450

*Does not include those receiving graduate degrees from Schools of Public Health.

Placement of Graduate Majors. Table VI shows the placement of the four hundred and fifty (450) graduate health education majors who were granted a fifth-year teaching certificate or a graduate degree, during the five school-year period covered by the study.

Three hundred and eighteen (318), or approximately seventy-one per cent, of these graduates secured some type of school health education position, distributed as follows: senior high school 160; college or university 67; junior high school 40; health coordinator 22; elementary school 21; and junior college 8.

Fifty-one, or approximately eleven per cent, secured some type of public health education position, distributed as follows: public health department 25; voluntary health agency 21; commercial and industrial health educator 3; and Y.W.C.A. 2.

TABLE VI

Placement of Graduate Health Education Majors for the Five School-Year Period, 1947-1952.

Rank Ordr	*Type of Placement*	*Number*
1	Senior High School	160
2	College or University	67
3	Junior High School	40
4	Nursing and Health Education	30
5	Military Service	29
6	Public Health Department	25
7	Health Coordinator	22
8	Elementary School	21
9	Voluntary Health Agency	21
10	Graduate Work	13
11	Junior College	8
12	Public Welfare	4
13	Unaccounted for	3
14	Unemployed	2

1. Such as is required in California and other states—where students *may* complete the Bachelor's Degree, with a major in health education, and complete requirements for a general secondary credential during the fifth year, but do not necessarily complete a Master's Degree.

15	Commercial Health Educator	2
16	Y.W.C.A.	2
17	Industrial Health Educator	1
18	Public Health Apprentice	0
	Total	450

Placement of All Majors. Table VII shows the placement of *all* health education majors graduated during the five school-year period covered by the study. This composite table includes the five- hundred and seven (507) students granted the bachelor's degree, plus the four hundred and fifty (450) granted a fifth year teaching certificate or graduate degree.

Four hundred and sixty-one, or approximately forty-eight per cent, of the total group secured some type of school health education position. These school health education positions were distributed as follows: senior high school 235; college or university 97; junior high school 51; elementary school 46; health coordinator 32.

One hundred and sixty-five, or approximately seventeen per cent, secured some type of public health education position. These public health education jobs were distributed as follows: voluntary health agencies 88; public health departments 62; industrial and commercial health educators 10; public health apprenticeships 3; and Y.W.C.A. 2.

TABLE VII

Placement of All Health Education Majors, Five School-Year Period, 1947-1952, United States.

Rank Order	*Type of Placement*	*Number*	*Percent*
1	Senior High School	235	24.6
2	College or University	96	10.0
3	Voluntary Health Agency	88	9.3
4	Graduate Work	74	7.8
5	Public Health Department	62	6.5
6	Unaccounted for	58	6.1
7	Military Service	54	5.6
8	Junior High School	51	5.3
9	Nursing and Health Education	50	5.2
10	Elementary School	46	4.8
11	Housewife	33	3.4
12	Health Coordinator	32	3.3
13	Physical Education and Recreation	30	3.1
14	Industrial and Commercial Health Education	10	1.0
15	Physical Therapy	9	0.9
16	Unemployed	8	0.8
17	Public Welfare	4	0.4
18	Public Health Apprentice	3	0.3
19	Y.M.C.A.	2	0.2
20	Miscellaneous Placement*	12	1.3*
	Total	957	100%

**These 12 positions were distributed as follows*: Department of Public Welfare 1; Civilian Director of Health, Air Base 1; Research Chemist 1; Dental Hygienist 2; Club Work 1; Business 1; Credit Agency 1; State Health Council 1; Hospital Attendant 2; and Juggler on the Stage 1.

IMPROVING JOB OPPORTUNITIES AND SALARIES

Salary Range of Health Educators. Table VIII shows the salary ranges for the various positions held by the nine hundred and fifty-seven health educators. It should be kept in mind that the majority of this group are recent graduates with little or no job experience — many of whom are holding their first health education job. However, a few health educators in the higher paying positions are mature, experienced persons who completed their doctoral degree during the period covered by this study.

The majority of health educators included in the study are holding positions with salary ranges of from $3,000.00 to $6,500.00 on a nine months basis and from $3,500.00 to $7,500.00 on a yearly basis.

TABLE VIII

Salary Range of Health Educators Granted Undergraduate and/or Graduate Degrees 1947-1952.

Basis	*Bachelor's Degree*	*Advanced Degree(s)*
9-10 Months	$2,200.00 to $4,500.00	$3,300.00 to $ 9,300.00
11-12 Months	$2,600.00 to $4,600.00	$3,500.00 to $11,500.00

Improving Job Opportunities and Placement. It is worth noting in Table VII that only eight (8) out of the nine hundred and fifty-seven (957) graduates, or less than one per cent, were listed as unemployed. This excellent record has been made under difficult conditions. During the past fifteen years it has been necessary to establish undergraduate and graduate curricula in health education and also to help create jobs for graduating health educators. This has not been an easy task.

Yet, the majority of the staff members involved have met the test with colors flying. As a group, they have taken steps to improve job opportunities for health educators, such as to:

1) Educate and stimulate school administrators to develop modernized health and safety education curricula in the elementary and secondary schools.

2) Educate and stimulate school administrators to schedule separate health courses at the junior and senior high school levels —in addition to correlated and incidental health teaching.

3) Educate school administrators and school boards to hire health specialists for teaching health in junior and senior high schools, and in colleges and universities.

4) Educate school administrators and school boards to see clearly that health education and physical education are two

closely related but separate fields, and that both need to be adequately provided for in the school program.

5) Increase apprenticeship opportunities in public health and with voluntary, industrial, commercial and professional agencies.

6) Cooperate with state health councils concerned with recruitment and placement of health personnel.

7) Promote local, state and regional workshops and conferences where school administrators and others may be educated to the need for health education and trained health educators.

8) Stimulate greater effort on the part of national health agencies and professional organizations to help create health education positions.

9) Promote needed changes in the certification of health teachers.

10) Promote the development of state joint committees in school and public health education.

11) Promote new or revised legislation specifically requiring health and safety education in grades 1 to 12.

12) Promote the development of local school-community health education programs, with appropriate budgets and personnel.

Respondents listed the following types of specific institutional and staff aid in helping health education graduates to secure positions (not listed in rank order): 1) student registration with placement bureaus, both institutional and private; 2) forwarding a dossier of each graduating student, along with a personal letter to prospective employers in the state and region; 3) posting job opportunities such as those announced through Civil Service and those listed in the Employment Service Section, American Journal of Public Health; 4) promoting apprenticeships and summer jobs which may develop into full-time positions; and 5) stimulating students to take the initiative in locating jobs by means such as contacting prospective employers at conventions, workshops and conferences.

SUMMARY AND CONCLUSIONS

The Committee gained the impression that the staff members in most of these colleges and universities are a dedicated group. They give every evidence of working hard to recruit, prepare and place *good* health educators and to advance the cause of health education in the United States and in the World.

A summary of some of the salient points concerning the

colleges and universities offering an *undergraduate* health education major follows:

1) Some thirty-five colleges and universities in the United States now offer an undergraduate health education major. This development of health education, as a new area of professsional training, has occurred mainly during the past fifteen years.

2) In some of these institutions, the professional health curricula are still largely paper programs. That is, few or no students have been enrolled or graduated during the five school-year period covered by this study. The majority seem to be making steady progress toward professional curricula that will be able to meet acceptable accreditation standards in the near future, if they have not already reached the standard.[1]

3) Only a few of the thirty-two institutions are considering the abandonment of the undergraduate health major. The majority of the respondents felt that substantial progress had been made during the past ten years.

4) Staff members have exercised commendable restraint in limiting the recruitment of health education majors to the number of existing job opportunities. There has been real concern on the part of some national leaders in school and public health education: that these institutions might focus upon quantity rather than quality and flood the health field with a large number of unemployable health educators. The data show conclusively that this has not occurred: only six (6) out of five hundred and seven (507) students graduating with a bachelor's degree were listed as unemployed.

5) The findings show conclusively that, during the five school-year period covered by this study, it has been difficult, but not impossible, for inexperienced health educators with a bachelor's degree to secure positions.

6) The types of positions secured by health educators with a bachelor's degree indicate that they need a good general education, plus professional preparation in both school and public health education, as part of their *undergraduate* program. The professional work should include both student health teaching in schools (preferably of the internship type) and field work in community health.

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1. For example: *Evaluation Schedules in Health Education.* Washington, D. C.: 23 pp. 1952. (May be ordered from American Association for Health, Physical Education and Recreation, 1201-16th Street, Washington, D. C., or American Association of Colleges for Teacher Education, 11 Elm Street, Oneonta, New York).

7) most of these staff members feel that they are in a key position to recruit *good* health education majors, with a bachelor's degree, who wish to do graduate work in a school of public health and then follow a career in public health education. However, the three-year experience requirement (plus the lack of apprenticeship opportunities in public health) for entrance into the graduate program leading to the Master of Public Health Degree, has acted as a bottleneck.[1]

Some of the main points regarding *graduate* health education majors are:

1) Nineteen (19) out of the thirty-two (32) institutions included in this study offer graduate programs leading to graduate degrees, with a major in health education.[2]

2) There are more job opportunities for those health educators holding a graduate degree or degrees. However, placement of those with a Master's degree still requires considerable effort. Those with doctoral degrees, so far, have experienced less difficulty in job placement.

3) Staff members in these nineteen institutions have limited recruitment in relation to the number of health education positions available, during the 1947-1952 school-year period. It is commendable that only two (2) out of the four hundred and fifty (450) students granted graduate degrees, during the five school-year period covered by the study, were listed as unemployed.

4) There was no indication that any of these schools are considering the abandonment of their graduate program in health education. Most respondents expressed a belief that, although much remains to be done, substantial progress has been made. As a group, they believe that there will be a greater demand for health educators with graduate training in the years ahead.

5) There is need for continued effort to create more and better health education job opportunities for those students graduating with a Master's degree in health education (other than the M.P.H. degree offered in Schools of Public Health).

6) There is a real need (1) to stimulate more and better research work in health education; (2) to develop more advanced graduate level health education courses, especially for doctoral students; and (3) to develop, in a few institutions, top-flight

1. *Criteria for Institutions to be Accredited for the Degree Master of Public Health. . . .* Reprinted from the American Journal of Public Health, Vol. 39, No. 2, pp. 230-232, February, 1949.

2. For reasons stated earlier, this number does *not* include Schools of Public Health.

graduate health education program leading to the research type of doctoral degree (Ph.D.) — to supplement present doctoral programs leading to professional degrees, such as the Ed.D.

The Committee is left with the general impression: that in the United States we are making slow, but sure, progress toward identifying and developing health education as a unique field of professional study, at both the undergraduate and graduate levels. Health education is being established as a profession open to both men and women who wish to follow a lifetime career of humanitarian service.

Continued progress along these lines will depend upon the cooperative efforts of the physician, nurse, public health worker, educator and many others—all working hand-in-hand toward a common goal.

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American School Health Association

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Professor of Health Education
University of Illinois
Urbana, Illinois

* * * * *

HENRY F. DYLLA, JR., APPOINTED

Henry F. Dylla, Jr., has been appointed for service advisor in the nutrition services of the Department of Mental Hygiene, Albany, N. Y., according to a recent announcement by Dr. Newton Bigelow, Commissioner of Mental Hygiene.

Mr. Dylla comes to the department with a varied experience in the nutrition field both in the armed services and in private industry. For the past two and a half years, he has been food specialist (equipment) in the Commissary Research Division at the U. S. Naval Supply Research & Development Facility, Bayonne, N. J. There his experience involved food service equipment, newly developed foods, navy recipe service and provision load lists.

ORGANIC COMPOSITION OF SALIVA AS A POSSIBLE FACTOR IN THE DEVELOPMENT OF DENTAL CARIES

NAOMI C. TURNER

Research Associate, Forsyth Dental Infirmary for Children

In the past 100 years various theories and hypotheses have been suggested to explain our high incidence of dental decay. The hypothesis most widely accepted and taught is based on Miller's experimentation in 1879-90.[1] Simply stated, Miller introduced an extracted tooth into saliva poured over bread as a substrate. Some destruction of tooth material occurred. In point of time, Miller's work was contemporary with the work of Pasteur and many workers in subsequent years accepted without question the idea that bacteria must be the primary offending agent. A long and relatively fruitless search has ensued.

From the idea of bacterial implication in acid production with subsequent tooth destruction, stemmed a great movement for oral cleanliness. Undoubtedly this movement has, from the aesthetic and personal hygiene viewpoint, been worthwhile and should be encouraged. It has not eliminated dental caries.

In 1943 Victor Dietz[2] repeated Miller's experiment. Dr. Dietz found that in order to have an effect on the tooth, the source of saliva had to be from a person prone to dental caries. This fact does not preclude the possibility of bacteria being implicated, but it does suggest that a person's own enzymic complement may be a vital factor in a chain-reaction leading to destruction of the tooth.

The dietary approach to the control of dental caries has not to date eliminated tooth decay. This may easily be, not because it is an unsound approach, but rather with our present state of knowledge we are missing some of the fundamental facts. Carbohydrates, especially sugar, have been widely considered in relation to dental health. The experience in Europe during the Second World War has shown how little exact knowledge we have as to what constitutes the best dietary for tooth health. As you know, under wartime rationing, England, Holland, Denmark, Norway, Finland and other countries experienced sharp reduction in their incidence of tooth decay among children. With the lifting of rationing, the rates have again increased. Some workers have considered that less refined carbohydrates during rationing might be an important difference. However, Dr. Sognnaes[3] in considering the Norwegian data says that "Any increase in the consumption of sugar which has taken place after the war has, therefore, not resulted in an immediate or uniform increase in caries in

those teeth which developed during the war period." The work of Boyd[4] indicated that if the dietary is complete in other respects the addition of sugar does not increase the dental caries incidence. A very interesting study of this point was made prior to the lifting of rationing in London, Sheffield and Liverpool and is currently being reported by the British Medical Research Council.

Fluoride is under such wide study and discussion that we will not consider it here except to note, in passing, that the fluoride ion has long been known as an enzyme inhibitor. The August, 1953, Journal of Dental Research, has a very interesting article by Dr. Fleming[5] of Yale on the "Effect of Fluoride on Developing Enamel and Dentine." Dr. Fleming studied the development of tooth germ transplants in guinea pigs. He concludes that the "action of the fluoride ion seemed at the enzyme level."

In considering factors related to dental caries, a clinically observed fact is that there appears to be a familial or ethnic pattern in caries occurrence. Bonner's [6] studies on neurospora suggest that certain enzymes are genetically determined. An example of this in the human species is seen in alkaptonuria. In enzyme systems we may have a partial explanation of the clinically observed familial tendency with respect to caries incidence.

The studies which we are reporting here today have dealt primarily with organic units in the saliva. We consider saliva, not so much as a simple fluid medium surrounding the teeth, but rather as a body fluid containing very interesting organic substances which may also be present in other body fluids. Isotope studies[7] by others have demonstrated that ions can migrate into and out of the tooth. Recently, too, it has been clearly demonstrated that the enamel has an extensive, although delicate, organic matrix.[8] No longer can we think of the enamel as a wholly inert substance unrelated to the body metabolism.

Without boring you with the technics and methodology which are in each instance reported in detail elsewhere, we will try to contrast for you certain chemical characteristics in the salivary profile of the child prone to dental decay and place beside it certain characteristics of the rarer child who is free from dental decay. Our work reveals a contrast between two extremes — no decay versus quite extensive dental decay. There are, of course, exceptions. Some of these exceptions may be accounted for by the fact that the child who is relatively caries-free today may be about to experience dental decay. Similarly a child who has had considerable dental decay may be passing into a physiological status

wherein his caries rate lessens for a time. The tests appear to be to a certain degree prognostic.

The varying phenomena associated with growth and development make a longitudinal study of the relationship between salivary organic units and caries occurence imperative if we are to avoid the pitfall of looking at a given individual only at a given time.

We are grateful to the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare, for making such a longitudinal study possible.

The individual who is experiencing active and rampant dental decay usually has a saliva which acts on starch so rapidly that the starch soon ceases to yield a blue or purple color with iodine solution.[9, 10, 11, 12] This individual may be said to have a fast hydrolyzing or dextrinizing time. The parotid saliva which freely bathes the first permanent molar (the tooth with greatest susceptibility) has a much more rapid dextrinizing time than the whole saliva, or the whole saliva minus the parotid. Saliva exclusive of the parotid consisting primarily of the sublingual and submaxillary saliva, which immediately bathes the lower incisors (the teeth least prone to dental decay), has a relatively slower dextrinizing time.[13]

Reverting for a moment to bacterial theorization, it is interesting to note that the parotid saliva yields nil bacterial count on tomato agar. Yet this lactabacillus-free fluid breaks starch several times as fast as the whole saliva even with its high bacterial content.

Perhaps we should pause for a moment here to consider the chemical pathways of starch breakdown. In malt amylase two components have been reported—alpha and beta.[14] Alpha breaks starch rapidly to a point where it no longer gives a blue or purple color with iodine, but its products hydrolyze relatively slowly to maltose. Beta amylase on the other hand, leaves starch in a form that maintains a blue or purple color for longer periods when tested with iodine; but it changes relatively quickly into maltose. While thus far only alpha amylase has been reported to have been crystalized from human saliva, [15, 16] the actions of different salivas are such that we would suspect the presence of both alpha and beta amylase or another as yet not fully characterized enzyme in varying proportions in human saliva.[17]

SALIVARY TESTS FOR DENTAL CARIES FREE CHILDREN VS. CARIES PRONE CHILDREN

(Averages from Groups of Different Sizes)

Test	*Caries Free*	*Caries Prone (extensive)*
Dextrinizing Time	> 20 min.	< 5 min.
Titratable Acidity	2.23 ml	3.47 ml
Acid from 1 ml saliva—1% starch suspension (2 hr Incubation)	.04 ml	.32 ml
Oxalic acid formed per gram starch as substrate	—	3.52 mg
Titratable Alkalinity	11.45 ml	8.83 ml
Quinone Absorbance	.82	.42

Briefly stated the child subject to dental decay has a fast dextrinizing time, probably indicating a high proportion of alpha amylase. The caries-free child on the other hand characteristically has a saliva which breaks down starch slowly as measured by the rate of disappearance of blue color in the presence of iodine solution. Time may show him to have a high proportion of beta amylase or other protective enzyme.

The caries-prone child may or may not have a high titratable acidity of his resting saliva; but he will more often than not have a low titratable alkalinity or buffering capacity. The caries-free child often has a low titratable acidity of his resting saliva and usually his saliva has a higher than average alkalinity or buffering capacity.

The differences in titratable acidity of saliva between individuals are not in our experience so closely associated with caries experience as are the differences in the way that the acids are handled by the saliva. This factor, measured as titratable alkalinity or buffering capacity, is significantly associated with caries experience. This factor, reported as buffering capacity by Dreizen, Mann, Cline and Spies[18] (in the south) by Sullivan and Storvick[12] (in the northwest), and as titratable alkalinity by Bell, Scribner and Turner[19] (on the east coast), shows with all workers a significant association with dental caries experience. This same relationship had been observed by Röse[20] in Europe in 1905, by Marshall[21] on the Pacific coast in 1915, and by Hubbell[22] in New York in 1938. It is not so clearly the presence of acid in rest-

ing saliva but rather the absence of buffers to handle acid production that is found fairly consistently associated with suceptibility to dental decay.

Our studies relate to saliva taken at least two hours after the ingestion of food. It is collected from a mouth in which the teeth have been brushed following the food intake, that is, we are probably safe in assuming that we are here measuring titratable acidity and titratable alkalinity of resting saliva not primarily acid developed as a result of food present in the oral cavity. When such saliva is placed in a test tube in which corn starch is the substrate, there is marked difference in action between the salivas obtained from caries-prone and caries-free children. At the end of a two-hour incubation period of saliva and corn starch, the caries-prone child as a rule shows many times more acid than the caries-free.[23] Among the acids developed under these conditions, it has been possible to measure the production of oxalic acid from saliva and corn starch.[24] To date we have done this only for the caries-prone child. For these individuals the amount of oxalic acid developed per gram of corn starch is of the order of 3.52 mg.

One other salivary characteristic seems to distinguish the caries- free child from the caries-prone one. This characteristic I would like to dwell on at greater length as our studies on this point have not previously been reported. This work was done jointly with Dr. Ana Ochoa Barreto and Dr. George E. Crowell. We expect that these studies will subsequently be reported in detail. The characteristic referred to is the acceleration of the production of quinone from hydroquinone under the influence of saliva. The process of changing hydroquinone to quinone involves, of course, a transfer of hydrogen. The "t" values for statistical significance which relate this factor to caries occurrence run higher than for any other saliva-caries relationship which we have reported. The number of children in this series is 212; the age range is 6-14 years.

The testing procedure is as follows: Saliva is collected without paraffin stimulation. A minimum of two hours has been allowed to elapse since the last meal. Since parotid saliva (the pH of which runs as low as 5.5) shows little or none of the characteristic under study, whole saliva is used in this test. To two milliliters of freshly collected saliva, two ml of hydroquinone solution (100 mg. hydroquinone to two ml distilled water) are added. After brief shaking this mixture is placed in an incubator or water bath at 100°F and kept at this temperature for sixty min-

utes. After this time interval, when quinone has developed from hydroquinone, the test tubes are removed from the incubator, the solutions are centrifuged for ten minutes, color absorbance is read on a Beckman spectrophotometer at a wave length of 450 mu.

There are wide differences from person to person in quinone development under these standardized conditions. In a sample of 212 children a "t" value of 8.41 was obtained when caries-free children were contrasted with children having more than 20 DMF surfaces. For significance at the 1% level, the "t" value needs to be only 2.63, but in this series it was 8.41.

Next to the quinone factor titratable alkalinity has differentiated these groups best with a "t" value of 5.69.[25] It is of interest that between titratable alkalinity and the quinone factor for this same group of children, a correlation coefficient (r) of .54 is found with a standard deviation of r of .048. If r is three times the standard deviation of r a significant difference is suggested. Here we have r more than ten times the standard deviation of r. Thus the association between titratable alkalinity and the quinone factor would appear not to be wholly due to chance.

We experimented by adding each individual amino acid to salivary samples prior to their mixture with hydroquinone. Our results suggest that factors other than alkalinity are operative. The addition of certain of the amino acids produced little or no effect. The addition of certain acidic amino acids had an inhibiting effect. In spite of a near neutral pH of the solution, the addition of di-iodo-tyrosine (an amino acid probably involved in alpha amylase activity) inhibited quinone production appreciably (—3.92). Serine's potentiation at a pH of 7.4 was only slight (+.153). Seven of the 19 amino acids (not far from neutral pH) gave strong positive potentiation to the salivary dehydrogenase affecting hydroquinone; they were in ascending order of effect: leucine, norleucine, phenylalanine, alanine, tryosine, valine and tryptophane.

Our earlier studies on tryptophane's effect in delaying alpha amylase action were reported in your Journal of School Health in 1945.[26] It is interesting that in this dehydrogenase factor, associated with freedom from dental decay, tryptophane should occupy the unique place of affording greatest potentiation to the salivary action. That is, in the test tube, the addition of tryptophane changes the behavior of saliva from caries-prone children in the direction of the behavior of saliva from caries-free children.

SUMMARY

We do not yet understand fully all the factors contributing to the development of dental caries. Tooth brushing has not eliminated dental decay. We have not succeeded in bringing tooth decay under control through dietary means. The studies here presented seek to determine the relationships of differences in certain organic units of saliva and other body fluids which play a role in susceptibility to dental caries.

Four groups of workers have noted a significant association between dental caries proneness and the speed with which salivary amylase breaks starch as tested with iodine solution.

Titratable acidity of resting saliva is less closely and consistently related to caries occurrence than is titratable alkalinity or buffering capacity. The latter has been reported by six groups of workers from 1905 to 1953 and shows with all workers a significant association between this factor and dental caries experience.

We have here noted a relationship between a quinone producing factor in saliva and dental caries proneness. Individuals who are free from dental decay produce quinone from hydroquinone, at a fixed temperature and in a given unit of time, in greater amounts than do individuals subject to much dental decay. A correlation coeffcient of .54 between this factor and titratable alkalinity is found. This naturally occurring factor associated with freedom from dental decay is under further investigation in our laboratory in order to determine to what extent it is enzymic, genetically determined, buffer associated, and which amino acids contribute to its activity.

Studies reported above are being carried forward under a grant to the Forsyth Dental Infirmary for Children from the National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

I would like to express appreciation to Dr. H. M. Marjerison, Director of the Forsyth Dental Infirmary for Children, to Dr. C. E. Hatch, Chief of the Clinic, and to Dr. V. O. Hurme, Director of Clinical Research, for guidance in the dental aspects of this study and for an environment in a dental institution where this thesis could be formulated and the work reported could be carried out.

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SCHOOL HEALTH FILM

The Oklahoma State Department of Health announces a recently developed film available in black and white or in color, entitled "School Health in Action." The film, produced by Sam Orleeans and Associates, 211 W. Cumberland Ave., Knoxville, Tenn., portrays the latest professional thinking in the field of school health and is endorsed by the Division of Maternal and Child Health of the Oklahoma State Department of Health, as well as by the Oklahoma State Medical Association. It tells the story of how a typical city in Oklahoma recognized its health problems and through community effort launched a movement for their solution.

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THE SCHOOL HEALTH PROGRAM AND COMMUNITY HEALTH

Any community is made up of individuals with diversified specific functons, desires, interests, abilities, and other personal characteristics which form the basis for the establishment of numbers of groups whose actions and interactions can in a large measure determine the ultimate ability of that community to recognize and meet its problems. An important group within each community is the student group.

Since members of school groups at any educational level must conform to certain norms within a given range for age, educability and performance capacity, it is obvious that much thought and planning should lead to the building and maintenance of the best possible physical plant and its environs, and to the selection of the most competent leadership to bring about effective realization of the goals and objectives set for each group.

We now recognize that, specialized as it appears, the school population is but a partially and temporarily segregated group of citizens who will be expected to return to a community after they leave the classroom. What we as educators can give them may to a large extent determine community action later. In the area of healthful school living, it is up to us to see to it that our efforts are directed toward the promotion of an understanding of what it means to live as a member of a family, a school group, or a community. Our health is not only important to us as individuals, but also to those with whom we live. Consciousness and appreciation of the need for adjustment in behavior pattern may well be the foundation for effective group living in a school situation which will ultimately color our later behavior and our responses in larger community situations. The recognition of personal health needs and their significance for the public health in the community may be stressed to advantage in the health pro-

gram at all educational levels. A sound health service program with effective communicable disease control, healthful sanitary and safety practices in all parts of the physical plant, togeher with a functional health education program should lay the foundation for the best possible community health program.

A classroom population may provide a fairly well-controlled and nearly homogeneous group, under the selected guidance of one or more individuals in intimate association with the same group over an extended period of time. The intelligent expansion of a school health education program with each advancing grade level can well be the forerunner of an adequate health program for the community at large, if knowledge and attitudes become firmly established and presage later behavior in recognition of needs and in response to demands for community action. A school health program needs to be built on the recognition that at all stages it is a part of the larger community health program and in total accord with it. — *M. A. H.*

PERSONALS

It was with deep regret that we heard of the recent death of Dr. Charles F. Good, Directing Supervisor, School Health Services of the Board of Education, Cleveland, Ohio. Dr. Good had been a member of the Governing Council of the American School Health Association and had served the interests of this organization for many years. His loss was deeply felt by members of the Council and his many friends of the American School Health Association. A note of condolence was sent to Mrs. Good in the name of the Association.

* * * * *

At the first annual meeting of the Illinois Society of Public Health Educators held in Springfield, December 3, 1953, a dinner was given in honor of Mr. B. K. Richardson, Senior Administrative Officer in the Illinois Department of Public Health. Mr. Richardson, an employee of the State Health Department for thirty-four years, was presented with a certificate of honorary membership in the ISOPHE in recognition of his "outstanding contribution in public health, especially in the field of health education." In his address Dr. Richardson called attention to the fact that the field for professional health educators is a very fertile and promising one. He outlined the development of public health in Illinois, dating it back to 1877, when the State Board of Health was established.

TESTING HEALTH INFORMATION OF STUDENTS AND ADULTS

H. F. KILANDER, Ph.D.
Associate Professor of Education, School of Education, New York University

The health program of a school should produce two types of outcomes—health outcomes and educational outcomes. Illustrations of the former are: an increase in height and weight, greater endurance, a reduction in the number of absences due to illness and accidents, and better personalities. Each of these can be measured in some way.

This paper, however, will not deal with the outcomes directly, but will give attention to the educational outcomes of the school health program and their measurement.

Educational outcomes can be grouped into four specific areas: knowledge, attitudes, habits, and skills. For the purposes of this paper, these educational outcomes are described as follows:

Knowledge: This term is used here to cover collectively facts, information, understanding, know-how, and experience in general whether obtained directly, or vicariously, as through a class discussion or through reading in a book.

By knowledge is further meant those items of learning by which the pupil learns what to do in a given situation, and enough about why it is done to make the procedure meaningful insofar as he is able to understand it. It includes such knowledge as can be understood and used by the pupils and adults on their respective levels of experience and ability.

Attitudes: The term is meant here to include motivation, drives, incentives, emotions, morale, ideals, preferences, likes and dislikes, prejudices, interests, and the desire or will to do something.

Habits: This term when used in this paper refers to behavior, conduct, practices, responses, and applications — the doing as related to health.

Skills: The term is used here, in relation to health education, to include certain neuro-muscular activities in such areas as first aid and home care of the sick. Knowing how to apply artificial respiration or how to read a thermometer, are examples of such skills. Skills have some of the characteristics of both knowledge and habits.

Presented before the American School Health Association, Monday, November 9, 1953.

MEASURING EDUCATIONAL OUTCOMES

Of the four educational outcomes of health education just mentioned, the most important one to achieve—the goal—is the development and practice of desirable habits or behavior. But it is difficult to measure the effect of education on the development and improvement of habits except by direct observation. The opportunity for doing this is ordinarily rather limited for teachers. Parents are in a much better position to observe health behavior. The individuals themselves can participate by filling out check-lists.

Attitudes, similarly, are very difficult to measure objectively, although there are a few tests now available in certain areas of health education using refined techniques which contribute to the usefullness of the testing instrument.

It is only knowledge which can be tested with a fair degree of accuracy. Yet, the attitudes and habits are of most importance. It is generally agreed, of course, that knowledge is also an essential part of the program in health education. For knowledge contributes to the development of new attitudes and to the improvement and strengthening of old ones. And attitudes determine one's behavior. So knowledge is needed to furnish rational motives for action. Also, it is not possible in school to form or to practice all the specific health habits needed by an individual child, youth, or adult; so knowledge is essential in aiding the individual to make satisfactory responses to new or altered situations outside of the classroom, and later in life.

Patty agrees that emphasis upon health practices is of course most desirable, but he wonders whether or not the emphasis upon practice may not have gone too far in discrediting the value of health information upon which intelligent practice often depends.

We grant that knowledge does not always motivate to action or to the desired action. But, no action occurs without motivation, and motivation does not occur unless based upon some previous experience which has supplied information or understanding of some type.

Many individuals who take the viewpoint that knowledge of health principles is unimportant confuse the level of information which can justifiably be presented in the lower grades with that which can be given in the senior high school or in college.

It is important, of course, that all individuals, regardless of age, practice the desirable habits. It is also important that all have the needed attitudes to assure the carrying through of the

desirable practices. Consequently, education from first grade through twelfth grade must give direction to these two learning outcomes. But also, as the child matures, the amount and type of information which he needs and which he can understand, must progressively increase.

Students in the high school need and want facts. Facts challenge them more than does a continuous repetition of habit statement which they have heard so many times before. The same point applies to college students. By giving emphasis to facts does not mean that our program should not make provision, as far as possible, for the exercise or application of this information in the daily routine of living.

TESTING HEALTH KNOWLEDGE

Granted that knowledge as a phase of learning in the field of health education is important, what are the values or uses of testing such knowledge?

Briefly, knowledge testing can be used for, and in, the following ways:

Pre-testing. When a test is given at the beginning of a course in any given grade, it can be used to help determine the individual and group strengths and weaknesses in health knowledge. Such information is very helpful as a guide in planning the course emphasis.

Post testing. By testing at the end of the course, or class, or over a period of years, one can obtain an idea of the effectiveness of the teaching and learning processes. When an alternate test form to that for pre-testing is used, reliable information is obtained which can be used to further improve the instructional program.

Motivation. Students are very likely to be motivated to further study and to application of that knowledge when their test scores are compared with the group norm. Testing stimulates discussion which in turn adds to the learning. It is a means of convincing a student that he is in need of learning health facts and their applications.

Evaluation of teaching. When the teacher or the supervisor has information about the level of learning resulting from health education classes, certain conclusions can no doubt be reached about the values of various methods of instruction. Also, the relative effectiveness of different teachers and curriculum plans may be rated. Evaluation of health teaching, and therefore health

learning, should be made upon the basis of the gains made by pupils.

RESEARCH IN HEALTH KNOWLEDGE TESTING

For over twenty years, the speaker has carried on a continuous research study concerned with the determination of the health knowledge of the American public. During this time, hundreds of groups comprising thousands of individuals have been tested. Included have been junior and senior high school students, college students, and adults of various walks of life.

General broad health knowledge tests [1, 2, 3], have been used in testing many of these groups. For others, single health area tests, such as on first aid, tuberculosis [4, 5], nutrition [6, 7, 8], personal health or mental health, have been used.

Many educators have cooperated by supplying further statistical information based upon the use of these same tests. Included in these studies have been four doctoral dissertations [9, 10, 11], and at least a dozen master's dissertations.

Research in this area conducted by other individuals [12, 13, 14], using their own testing instruments, has also been examined over the years. It has included such data as that obtained by the U. S. Public Health Service at the World's Fair in 1937 covering 100,000 individuals.

The findings and conclusions from each of these studies would be too extensive to report here individually. Instead, a summary of certain findings and observations may be of interest to you and is here presented.

1. *Few individuals are found to be adequately informed in all of the various areas of health knowledge to be able to act wisely for their own personal needs.* For example, only about one-half of the public tested knew enough about nutrition to make it possible to select a balanced meal in a cafeteria without consideration of the cost of that meal.

For the elementary and secondary schools, this means that health instruction needs to be increased and be made more effective. For the colleges, it means that instruction needs to be planned to supplement that given or not given, in the secondary schools, and to meet current needs of college students as students, as well as certain future needs.

For the many who leave school before receiving even some instruction in each of the various fields of health, it means that adult education programs, conducted by public health depart-

ments, voluntary health organizations, and other groups must attempt to fill in the void left by the schools and, in addition, anticipate future and changing needs of all adults.

2. *There has been a slight but steady improvement in the level of information held by students and adults over the years covered by this study.* This change has not been equal in each of the areas of health knowledge. Individuals still hold many misconceptions about nutrition, weight reducing, tuberculosis, prenatal influences, mental health and first aid procedures. Outright superstitions are not held as extensively by secondary school and college students and the young adults as formerly, but other adults continue to hold on to many misconceptions.

It is apparent that the learning process is going on, but it is difficult to determine exactly which of several factors has contributed most to the increases. One would like to assume that the school health instruction has been an important factor. But other factors, such as the radio, TV, the press, and popular magazines have no doubt also contributed to improved knowledge. But many of these media of mass education are also adding to the misinformation of the public.

3. *The level of information is found not to be very different for differing parts of the United States, when sufficiently large and varied samplings of the population are taken.* However, the range within a given classroom or other group varies considerably more than the mean scores between groups.

One conclusion from this observation might be that the informational needs for the various parts of our country are more alike than different and, therefore, the health instruction program of one school system need not be too different from that of another system. However, in a given classroom, instruction needs to be adapted, as far as possible, to the differing individual needs; this calls for expert teaching, small classes, and supplemented by individual health counselling and guidance.

4. *There is a continuous rise in the level of health information for successive grades in school.* This rise tends to level off by the senior year of high school.

The rise in the mean scores in the secondary school is related to the amount of health instruction received—either in special health education classes or as a part or related subject fields such as biology, general science, physical education, and home economics.

A college education *per se* does not necessarily add to the health information of students. College students—freshmen as well as seniors—when compared with high school seniors of approximately the same intelligence, are not likely to score higher on health information tests unless they have had specific additional health instruction since leaving high school.

Science courses on the college level contribute less than on the high school level toward an increase in health information, as judged by these studies. Science courses in the high schools include more health content than is the case in the colleges.

5. *Intelligence has considerable influence upon the level of health knowledge, as is to be expected. So, also, does the home and community environment.* The scores of younger children seem to be more affected by the type of home environment than those of older ones.

6. *The relationship between health information and health practices is, in general, positive.* Those individuals who are better informed tend to have better health practices.

There are exceptions, of course, but health education is not peculiar in this respect. Not all of those who have been taught correct grammar apply it in their daily conversation.

Variations in the application of knowledge is illustrated by the findings that young women are slightly better informed than young men on the subject of nutrition, but the young men select food more wisely and, in general, eat better. But the better informed women tended to eat better than their less informed sisters.

Massey[11], in his doctoral study, found a notable lack of relationship between health habits and scholastic aptitude, but found a low but definite relationship between health information and desirable health practices.

EXAMPLES OF HEALTH MISCONCEPTIONS

The following examples of the more amusing misconceptions are selected from the many test items used in the various tests:

1. Nearly half of those tested believe that communicable diseases can be biologically inherited and slightly fewer state that "tuberculosis is one of the diseases which may be inherited."

2. Nearly two out of three individuals consider alcohol a stimulant rather than a narcotic or depressant.

3. Approximately one-third of the students in college believe entirely or in part that "a prospective mother can make her child more musical if she listens to good music."

4. About one-fourth of the public believes that there is some truth to "fish being a brain food."

5. Between 15 and 40 percent of the various groups hold that raw meat will reduce a swelling or a "black eye" due to a bruise.

6. About one in four believes that a newborn child's disfiguration may be caused by the mother's fright during pregnancy.

7. Some 15 to 40 percent consider chiropractors on par with medical doctors, and a few even indicate that they are superior.

8. Nearly half of those tested consider water to be fattening.

9. Only one-third realize that the lower death rate of today is primarily due to the prevention of infant deaths rather than to the prevention of adult deaths.

10. By contrast, practically everybody indicated that malaria was spread by mosquitoes.

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THE NEW EDITOR-IN-CHIEF

Your new editor is Marie A. Hinrichs, M.D., Associate Professor of Health Education at the University of Illinois. Dr. Hinrichs is a Fellow of the American Public Health Association, and Chairman-elect of the Seftion on School and College Health Services of the American Association for Health, Physical Education, and Recreation. She graduated from the Chicago Teachers College; Lake Forest College, with an AB degree; and from the University of Chicago, where she obtained her Ph.D. and M.D. degrees. Research experience was gained in cellular physiology and radiation physiology at the University of Chicago, and at the Nela Laboratories, in Cleveland. Fourteen summers spent in study and research at Woods Hole Marine Biological Laboratory and one at Friday Harbor plus two years as National Research Council Fellow at the University of Chicago resulted in the publication of over forty papers.

Teaching experience includes Chicago Public Schools. (at the elementary level), Vassar College, Southern Illinois University and The University of Illinois, plus some experience in supervision of practice teaching in physiology and health at the high school level, and several summer health education workshops at Southern Illinois University.

Clinical experience was obtained in private practice, camp supervision (as Medical Director), medical officer-in-charge (civilian status) for the 69th College Air Force Detachment, and seventeen years in college health services, fourteen of which were in an administrative capacity.

Other school health experiences include membership on Illinois state-wide health committees, and working in cooperation with Chicago's Institute for Juvenile Research, Home Bureau and P.T.A. and for many years as medical consultant for the Child Guidance Clinic at Southern Illinois University.

Dr. Hinrichs is listed in American Men of Science, and several other "Who's Who" publications. She holds membership in many state and local health groups as well as Sigma Xi, American School Health Association, American Physiological Society, Society for Experimental Biology and Medicine, American Public Health Association, American Association for Health, Physical Education and Recreation, American Association of University Professors, American Medical Association, Nu Sigma Phi Medical Sorority, and is Past National President of Sigma Delta Epsilon, (National Scientific Women's Association).

REVIEWS

Health Yearbook, 1953. Edited by *Oliver E. Boyd, Ed.D, M.D.* Stanford, Calif., Stanford University Press, 1953. 280 pages. $3.50.

The usual revision of the Health Education Yearbook under the new title, covering the most recent articles from professional Journals, Reports from various sources in the field of world health problems, safety, and school and community health. A very much worthwhile addition to public and school health education that should be in the library of health educators and of school and community instructors and supervisors in the School Health Program.—*C. H. Keene.*

* * * * *

School Nursing in the Community Program, by *Marie Swanson, R.N.*, The Macmillan Company, New York, 1953.

We have come a long way in a half century in the development of a health service for school children. In its beginning, that service centered in the nurse, and today, the nurse is still its central agent. Take her away and the whole, often complex, machinery falls apart. It functions well, or ill, according as she is well, or not so well, prepared and directed.

The many-faceted field in which the nurse may now find herself is admirably covered in the five hundred pages of this book by one who, from experience and continued study, knows her subject from A to Z. From prenatal counseling to care of the college student, it is all here, carefully and fully expressed. There is a chapter on "The Nurse and Camping for School Children."

The work should be welcomed by health officials and especially by those who have to do with the training and supervision of school nurses, and a copy should be made available for nurses in service. They will find it a great help in meeting the difficult situations in which they often find themselves.—*J. F. Rogers.*

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